

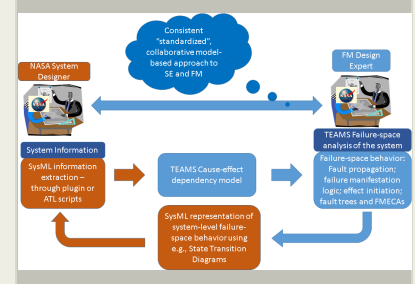
Fault Management Technologies, Phase II

Completed Technology Project (2015 - 2017)



Project Introduction

There has been a renewed push across NASA centers and programs to make Systems Engineering & Integration (SE&I) processes more efficient and results-oriented than the current cumbersome and expensive cross-checking processes using text documents, and transition to a repeatable and a cost-effective process of Model Based Systems Engineering (MBSE). In parallel, Systems Health management (SHM), with its operational subset Fault Management (FM), has also been developing with rigorous model-based practices, but largely separate from the mainstream of Systems Engineering and Design activities in NASA and the DoD. The technical and knowledge gap between the SE&I and SHM processes results in significant inefficiencies during product design, verification and validation, and excessive operational maintenance costs, collectively yielding unacceptably high life cycle costs and failure rates. To address these challenges, QSI with Dr. Stephen Johnson, intends to develop tool neutral architecture, processes and interfaces for integration of model-based SE&I designed in SysML (Systems Modeling Language), with SHM modeling and analysis performed in TEAMS® (Testability Engineering And Maintenance System). It is our intention to reduce the duplicative and disjoint effort by NASA's subject matter experts in the development of systems engineering and design models as well as systems health management/fault management models. The benefits realized through this effort are (a) Reduced systems engineering and fault management costs, combined with improved quality and traceability, as well as enhanced communication and coordination among stakeholders, (b) Improved quality of SE&I and SHM products by having inherent traceability across models and ability to catch defects in design and FM earlier, and (c) Establishment of modeling recommendations for NASA community as it develops its MBSE approaches and models.



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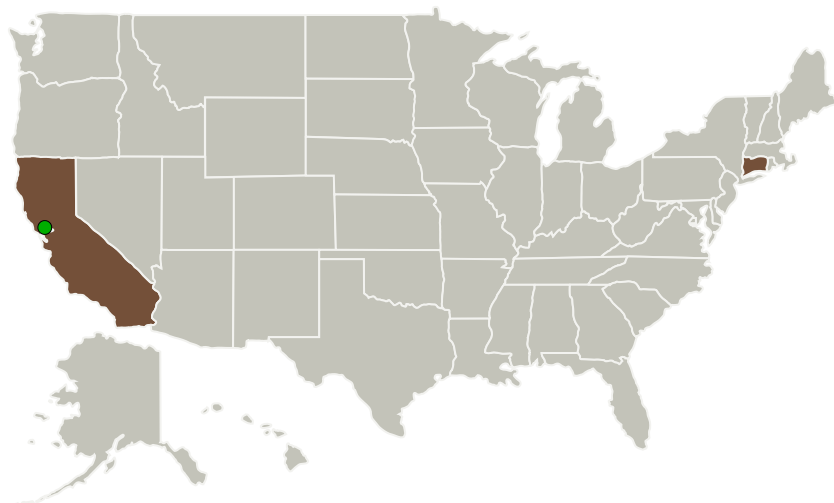
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Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
Qualtech Systems, Inc.	Lead Organization	Industry Minority-Owned Business, Small Disadvantaged Business (SDB)	Rocky Hill, Connecticut
● Ames Research Center(ARC)	Supporting Organization	NASA Center	Moffett Field, California

Primary U.S. Work Locations

California	Connecticut
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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Qualtech Systems, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

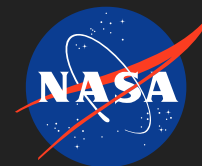
Sudipto Ghoshal

Co-Investigator:

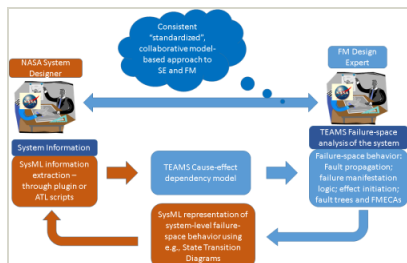
Sudipto Ghoshal

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Images



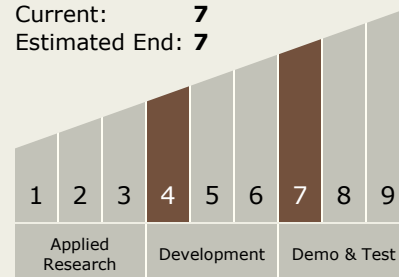
Briefing Chart Image

Fault Management Technologies,
Phase II

(<https://techport.nasa.gov/image/126008>)

Technology Maturity (TRL)

Start: 4
Current: 7
Estimated End: 7



Technology Areas

Primary:

- TX10 Autonomous Systems
 - TX10.2 Reasoning and Acting
 - TX10.2.2 Activity and Resource Planning and Scheduling

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System